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ALBERTA ECONOMIC MULTIPLIERS

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Bureau of Statistics

**ECONOMIC MULTIPLIERS FOR
ALBERTA INDUSTRIES AND COMMODITIES
(Based on 1984 Input-Output Tables)**

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PREFACE

This report presents the most current economic multipliers for household income, gross domestic product (GDP) at factor cost, employment and output for the Alberta economy. The multipliers have been derived from the 1984 provincial input-output tables, which are produced quinquennially by the Alberta Bureau of Statistics based on information acquired from Statistics Canada.

The level of detail presented should be sufficient to meet most needs; however, alternate aggregations of industries and commodities can be produced from the input-output tables. The Economic Models group will attempt to meet special requests for input-output tables or other industry/commodity aggregations, subject to data availability and resource constraints. Enquiries concerning the publication or requests for additional copies of this report should be directed to:

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**ECONOMIC MULTIPLIERS FOR
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INTRODUCTION

This report contains economic multipliers for the Alberta economy. The multipliers are 1984-based and produced from the most recent 1984 provincial input-output tables. This data updates the previous 1979-based multipliers published by the Alberta Bureau of Statistics in 1987. Multipliers are provided for up to 38 types of industries and 73 commodities, the same level of detail as the 1979 multipliers.

The report is divided into six parts. Following the Introduction, the "What are Multipliers?" section provides a description of the various types of economic multipliers and their uses. The third section, "Using Multipliers", works through examples of using multipliers to measure the economic impact of a newly established manufacturing plant and a case of increasing exports. The fourth section sets out cautionary notes to be kept in mind when using multipliers. Twelve tables with the multipliers follow as the next section. Finally, the appendix contains data sources, the methodology used in deriving the multipliers, a comparison of the 1984 and 1979 multipliers, and the industry aggregation parameters.

WHAT ARE MULTIPLIERS?

Economic multipliers provide a means to quantitatively measure and assess the impact of changes in an economy. When there is a change in the economy (business opening/closing/expanding/contracting, changes in the demands for a commodity, tax changes, interest rate shifts, etc.), it impacts first on those firms, households and/or governments most directly involved. Then there is a ripple effect as this impact spreads through the economy affecting other firms, households and governments. Multipliers provide the tool whereby the total impact on the economy - on income, employment, gross domestic product (GDP) and gross output - can be measured.

Multipliers are derived from input-output (I-O) tables which detail the inter-industry relationships of production activities describing how much output each industry bought from and sold to other industries in the economy. Given the vast amount of detail required to compile I-O tables, provincial tables are produced every five years, the most recent being 1984.¹

The different multipliers presented in the publication are described in this section. The description basically falls into two parts - the measures used to indicate the impact of any economic change and how these measures are derived. Since the measures can be derived under different assumptions a number of separate multipliers result. Thus, a user must be careful to ensure the multiplier chosen is the appropriate one for the situation under consideration.

Four different ways of measuring the impact of economic change are presented in this publication, namely the impact on household income, G.D.P. (at factor cost), employment and gross output. Multipliers for each of these four measures are found in all tables.

¹

Although these multipliers are based on the 1984 input-output tables, and reflect the economic structure of that reference year, studies have shown that these multipliers are reasonably stable over time. Appendix III provides a 1984 and 1979 comparison.

Except for absolute employment multipliers, the interpretation of a multiplier value is basically consistent for all multipliers. The multiplier gives the impact of a unit change in the causal factors (e.g., if a \$1 change in industry output or commodity demand results in a \$2 impact on G.D.P., the multiplier would be 2.0). For absolute employment multipliers, the figure measures the total impact on number of jobs for every change of \$10,000 (in constant 1984 dollars) in an industry's output (industry multipliers) or in the demand of a commodity (commodity multipliers).

To estimate the multipliers, two basic input-output models - open and closed - are used. Multipliers calculated from the closed input-output model are called "total multipliers", while those from the open model are termed "simple multipliers". When there is a change in the economy (e.g., a production increase in an industry or increased demand for a commodity), the resulting effects can be thought of as emanating out in two ways - a direct and indirect industry effect and an induced income effect. When an industry increases its output, it must obtain more inputs which are provided by other industries. The expansion of these other industries means increased demands are placed on their suppliers, and so on through a chain of interdependent industries. This can be referred to as the industry effect. In addition, as industries increase their production, they increase staff and thus pay more in wages. This increased income in the hands of consumers can generate additional consumption and subsequent resulting increases in industry outputs. This may be referred to as the income effect.

The closed model (i.e., total multipliers) captures both the industry and income effects; the open model (simple multipliers) includes only the industry effect. Total multipliers are provided in this publication. Although simple multipliers have limited use and are not provided in this publication, they are available upon special request. More details about the open and closed models are presented in Appendix II.

For each of the two models (open and closed), multipliers can be derived either for industries or commodities, with or without leakages and in the absolute or ratio form. The various combinations result in twelve total and twelve simple multiplier tables.

With respect to industries and commodities, various levels of aggregation are possible. Two levels - major and detailed - (corresponding to the small and medium aggregations provided in the earlier Input-Output publication) - are presented for each of commodities and industries. Industry aggregation details are provided in Appendix IV. Although commodity aggregation details are not presented, they are available upon request.

Leakages Vs Without Leakages

Increased demand can be met by Alberta industry produced goods (i.e., domestic production), imports, withdrawals from inventory and government production. The latter three are referred to as leakages from domestic production (i.e., demand which is met by other than Alberta industry produced goods). To the extent these sources supplant domestic production in the supply of a commodity, the impact of an increase in final demand on domestic industries will be reduced.

Multipliers are derived with leakages (i.e., reflecting the actual situation) and without leakages (i.e., under the assumption that all demand is met by domestic production). Comparing a multiplier derived without and with leakages indicates the impact of the leakages on the economy for that particular industry or commodity. Imports are usually the major (and often only) leakage. Thus, if an industry or commodity has a much higher multiplier without leakages than it does with leakages, it is reasonable to assume for most cases that any increase in final demand is met largely through imports rather than domestic production.

Absolute Vs. Ratio Multipliers

Multipliers may be expressed in either the absolute or ratio form. For absolute multipliers, impacts on household income, employment, etc. are based on changes in the output of an industry or the demand for a commodity, i.e., output or demand is the causal factor generating change. For ratio multipliers (also known as traditional multipliers), the causal

variable is different for each impact with both cause and impact being measured in the same dimensions. These ratio multipliers show, for example, the total impact on household income in the economy resulting from a change in the contribution to household income by an industry, the total impact on employment in the economy as a result of a change in employment in a given industry, etc. An example should clarify the conceptual difference between these two forms of multipliers. Table 2 (line 4) gives an absolute household income multiplier of .344 for mines, quarries and oil wells, meaning that a \$1 million change in the industry's output would change total household income in Alberta by \$0.344 million. Table 4 (line 4) shows the comparable ratio multiplier - 2.682 - for household income for the same industry. Thus, if the industry adds \$1 million to household income (for example, through higher payrolls), total household income in the province would increase by \$2.682 million. As the example illustrates, for absolute multipliers the cause (a change in output) is not in the same terms as the impact (change in household income); for ratio multipliers both cause and impact are expressed in the same terms (i.e., household income in this example).

In comparing absolute and ratio multipliers, it should also be noted:

1. Gross output multipliers are identical for both (e.g., the figure 1.982 is found in both Tables 2 and 4 for mines, quarries and oil wells). As discussed earlier, the impacts measured by absolute multipliers are based on changes in output. The nature of ratio multipliers (i.e., both cause and effect measured in the same dimensions) means that the gross output ratio multiplier also is based on a change in output. Thus, in the absolute and ratio forms, identical gross output multipliers result.
2. Because the causal factors for ratio multipliers (i.e., change in household income, employment, etc.) are essentially industry related, such multipliers are not meaningful for commodities. Absolute multipliers, however, are available for both industries and commodities.

USING MULTIPLIERS

This section briefly illustrates the use of multipliers as a component (on either the cost or benefit side) in the decision making process. More detailed studies can be done as the user becomes more familiar with multiplier analysis.

Choosing the correct multiplier(s) to use in a particular situation requires deciding:

- (a) How the impact of the economic change is to be measured, i.e., on income, employment, gross domestic product and/or gross output.
- (b) What multiplier table(s) to use. This requires deciding upon simple or total multipliers, absolute or ratio form, with or without leakages, for industries or commodities and the level of detail for the industry or commodity. To simplify this decision process, it should be remembered:
 - (i) Applications based on simple multipliers are limited for most users. The examples in this publication deal only with total multipliers.
 - (ii) Multipliers which take leakages into account are more reflective of the actual situation and thus more frequently used than the "without leakage" multipliers.
 - (iii) When the causal factor is a change in production output, industry multipliers are used. When it is decided to measure the impact of a change in the demand for a commodity, commodity multipliers are the appropriate ones.

The following examples are only a small indication of the use of multiplier analysis. They illustrate how different multipliers can be used.

Economic Impact of A New Plant

Suppose a chemical plant costing \$100 million to construct and with a projected annual output of \$20 million is built in Alberta. Both the temporary construction impact and the

longer run production impact should be considered. For such analyses, Tables 2 and 6 (depending on the industry detail required) provide the appropriate multipliers because:

- (a) Absolute (rather than ratio) multipliers for industries (rather than commodities) are used when the changes (\$100 million and \$20 million) are expressed as industry output.
- (b) To reflect the actual situations, the "with leakage" multipliers are appropriate.

Table 6 provides the multipliers to assess both the construction and production impacts. The construction industry also appears in Table 2. However, as pointed out in the Cautionary Notes section, when the same industry appears in both the major and detailed tables, the multipliers from the latter should be used.

From Table 6, line 29, the economic impact (combined direct, indirect and induced) of the \$100 million (m) construction phase would be an increase of:

-	household income	$0.717 \times \$100\text{m}$	= \$ 71.7m
-	GDP at factor cost	$0.965 \times \$100\text{m}$	= \$ 96.5m
-	gross output	$2.748 \times \$100\text{m}$	= \$ 274.8m
-	employment (is based on per \$10,000 and is expressed in 1984 dollars)	$0.212 \times 9,000^*$	= 1,908 person years employment

* The deflated \$1984 value of \$100m is \$90m thus the employment factor is

$$\frac{\$ 90,000,000}{\$ 10,000} = 9,000.$$

The above figures provide the temporary impact on the economy during the construction phase. A similar set of calculations using Table 6, line 27 for the chemical industries would be required to determine the impact of the plant's longer run, ongoing annual production operations. The total impact would be the combined construction and ongoing operation of the proposed plant.

Sometimes it may be more practical to express a new development in terms of the jobs and/or payroll to be created instead of output. Suppose the new chemical plant construction had been described not in terms of output (i.e., \$100 million) but rather in terms of employment of 765 people. To ascertain the economic impact in such a situation (i.e., when the factors of production, rather than output, are specified) ratio, rather than absolute, industry multipliers are used.

From Table 8, line 29, construction employment would have generated a total of 1,908 (765 x 2.493) person years of employment.

It is interesting to note that the nature of ratio multipliers (i.e., industry contribution and total economic impact are being measured in terms of the same variable) means the impact on jobs can be determined without discounting to 1984, which is necessary for the absolute multipliers.

Export Promotion

Suppose expanded marketing efforts result in an increase of \$100 million of coal exports from Alberta. The impact of an increase in the demand for a commodity would normally be measured by commodity multipliers. When looking specifically at the impacts resulting from changes in the level of exports, the assumption is made that all goods exported have been produced in Alberta. In multiplier analysis, this means there can be no leakages at the final demand stage (although leakages at the intermediate demand level are appropriate).

The commodity multipliers (with leakages) in this publication have been derived to include leakages at the final demand stage (as well as at the intermediate demand level). This makes them unsuitable for measuring the impact of changes in the export levels of commodities. However, it should be noted that suitable commodity multipliers (that do not allow final demand leakages) can be derived and are available from the Economic Models group of the Alberta Bureau of Statistics on request.

Since the industry multipliers in this publication are derived on the basis of intermediate demand leakages only, is there any situation in which they can be used for analysis of export changes ? In the case where the commodity in question is produced only by one industry, the industry multipliers can be used since they are identical to the commodity multipliers derived with the same assumptions of leakages.

Since coal comes from one industry (coal mines), the impact of the \$100 million increase in exports can be determined from Table 6, line 4. For example, in this case, household income will increase by \$58.3 million, G.D.P. by \$105.6 million and gross output by \$240.4 million.

CAUTIONARY NOTES

Before using the multipliers presented in this publication, readers should review the following cautionary notes.

1. The multiplier values are derived from a simple static input-output model, which assumes capacity exists to meet an increase in demand. If an increase in demand can only be met by increasing capacity through an investment in new plant and equipment, the actual impact on the economy would be higher than that indicated by the multipliers in this publication.
2. The multipliers have not been adjusted for price changes since 1984. For ratio multipliers this does not create a problem since the method of deriving them results in their not being influenced significantly by price changes. The absolute multipliers for household income, G.D.P. and gross output also are not significantly affected, assuming that price changes for these factors parallel those for commodities and industry output. This is not an unreasonable assumption in most cases. It is the absolute employment multipliers where the effect of price changes is significant. Adjustments for price changes have to be made before employing these multipliers (as illustrated in the examples presented in the Using Multipliers section).
3. For an industry (e.g., petroleum and coal products) which is highly vertically integrated and uses arbitrary valuation methods in transferring product from one level of the industry to another (e.g., crude petroleum transferred to refineries), the ratio multipliers for income, employment and G.D.P. can be distorted and should be used with caution. If the value attached to the product being transferred from one level to another in the integrated industry is arbitrarily high, the resulting ratio multipliers (because of the way these multipliers are calculated) overstate the impact.

4. Multipliers can be derived with or without leakages. For the former, the leakages may be at the intermediate demand stage or at both the intermediate and final demand stages.² When using multipliers with leakages, one must always be aware of what leakages have been included so as not to misuse the multipliers. With a view to making them applicable to as many different situations as possible, the industry with leakage multipliers in this publication have been derived to include intermediate demand leakages only while the commodity with leakage multipliers include both intermediate and final demand leakages. As pointed out in the Using the Multipliers Section, one area where such commodity multipliers are not appropriate is when considering the impact of increased exports.
5. Some industries (e.g., agriculture, forestry, communications) are common to both the major industry and detailed industry multiplier tables. Similarly, some commodities (e.g., live animals, forestry products, beverages) are found in both the major and detailed commodity multiplier tables. In such cases, the multiplier values are somewhat different between the two levels of aggregation. Where this occurs, the multipliers for the more detailed level should be used. Multipliers based on a larger, more detailed input-output table are considered to be more accurate because the larger the table the easier it is to take into account the interdependencies among industries.
6. When comparing differences between multipliers with and without leakages, although either absolute or ratio multipliers can be used (depending on how the information is specified), the calculated differences are not necessarily directly

² To produce goods and services, industries require input goods and services. For example, the agriculture industry uses gasoline, fertilizers, machinery, etc. to produce grain, live animals and other agricultural products. When the goods and services are being demanded for the production process (e.g., gasoline, fertilizers, etc. in the above example), this is known as intermediate demand. When goods and services are being demanded by final consumers (including government) for ultimate consumption (and not as part of the production process) this is final demand.

comparable between the two forms of multipliers. As indicated in point 5 above, leakages are different between industry and commodity multipliers. The former have been derived to include only leakages at the intermediate demand stage while commodity multipliers include leakages at both the intermediate and final demand stages.

TABLES

TOTAL MULTIPLIERS BY INDUSTRY

TABLE 1

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY MAJOR INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	1.028	1.857	0.452	4.970
2 FORESTRY	1.039	1.757	0.288	4.450
3 FISHING, HUNTING AND TRAPPING	2.179	3.345	0.659	8.978
4 MINES, QUARRIES AND OIL WELLS	0.568	1.390	0.147	2.969
5 MANUFACTURING	0.984	1.797	0.314	5.062
6 CONSTRUCTION	1.159	1.836	0.355	4.954
7 TRADE	1.387	1.995	0.534	4.702
8 TRANSPORTATION AND STORAGE	1.072	1.804	0.359	4.457
9 COMMUNICATIONS	1.086	1.806	0.325	3.951
10 UTILITIES	0.790	1.876	0.187	3.198
11 FINANCE, INSURANCE AND REAL ESTATE	0.766	1.497	0.161	3.018
12 COMM., BUS. AND PERSONAL SERVICES	1.321	1.953	0.508	4.625
13 DUMMY INDUSTRY I (1)	1.043	1.778	0.355	5.762
14 DUMMY INDUSTRY II (2)	1.043	1.706	0.361	5.248
15 TRANSPORTATION MARGINS (3)	1.070	1.805	0.358	5.447
16 HOUSEHOLDS (4)	0.768	1.297	0.255	4.070

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 2

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY MAJOR INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	0.546	0.995	0.287	2.692
2 FORESTRY	0.614	1.018	0.150	2.551
3 FISHING, HUNTING AND TRAPPING	1.368	1.922	0.394	5.308
4 MINES, QUARRIES AND OIL WELLS	0.344	0.985	0.079	1.982
5 MANUFACTURING	0.514	0.956	0.159	2.866
6 CONSTRUCTION	0.666	0.966	0.194	2.672
7 TRADE	1.001	1.318	0.408	2.971
8 TRANSPORTATION AND STORAGE	0.653	1.075	0.221	2.597
9 COMMUNICATIONS	0.766	1.247	0.220	2.513
10 UTILITIES	0.573	1.495	0.117	2.231
11 FINANCE, INSURANCE AND REAL ESTATE	0.559	1.135	0.094	2.101
12 COMM., BUS. AND PERSONAL SERVICES	0.933	1.276	0.380	2.888
13 DUMMY INDUSTRY I (1)	0.304	0.460	0.114	2.193
14 DUMMY INDUSTRY II (2)	0.443	0.686	0.159	2.636
15 TRANSPORTATION MARGINS (3)	0.276	0.455	0.093	2.095
16 HOUSEHOLDS (4)	0.370	0.602	0.125	2.282

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 3

TOTAL MULTIPLIERS (RATIO FORM, WITHOUT LEAKAGES)
BY MAJOR INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	4.833	4.536	2.839	4.970
2 FORESTRY	3.323	3.326	5.626	4.450
3 FISHING, HUNTING AND TRAPPING	3.381	4.609	4.374	8.978
4 MINES, QUARRIES AND OIL WELLS	4.433	2.379	6.599	2.969
5 MANUFACTURING	5.929	7.872	6.893	5.062
6 CONSTRUCTION	3.415	4.803	4.168	4.954
7 TRADE	2.153	2.764	1.826	4.702
8 TRANSPORTATION AND STORAGE	3.220	3.382	3.080	4.457
9 COMMUNICATIONS	2.239	2.278	2.563	3.951
10 UTILITIES	2.222	1.715	3.754	3.198
11 FINANCE, INSURANCE AND REAL ESTATE	2.171	1.886	5.861	3.018
12 COMM., BUS. AND PERSONAL SERVICES	2.265	2.779	1.928	4.625

TABLE 4

TOTAL MULTIPLIERS (RATIO FORM, WITH LEAKAGES)
BY MAJOR INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	2.568	2.432	1.806	2.692
2 FORESTRY	1.965	1.928	2.918	2.551
3 FISHING, HUNTING AND TRAPPING	2.122	2.648	2.614	5.308
4 MINES, QUARRIES AND OIL WELLS	2.682	1.687	3.545	1.982
5 MANUFACTURING	3.098	4.188	3.503	2.866
6 CONSTRUCTION	1.963	2.526	2.280	2.672
7 TRADE	1.553	1.827	1.395	2.971
8 TRANSPORTATION AND STORAGE	1.962	2.015	1.900	2.597
9 COMMUNICATIONS	1.578	1.573	1.735	2.513
10 UTILITIES	1.612	1.367	2.348	2.231
11 FINANCE, INSURANCE AND REAL ESTATE	1.585	1.430	3.413	2.101
12 COMM., BUS. AND PERSONAL SERVICES	1.600	1.817	1.444	2.888

TABLE 5

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY DETAILED INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	1.046	1.854	0.477	4.958
2 FORESTRY	1.080	1.769	0.315	4.459
3 FISHING, HUNTING AND TRAPPING	2.252	3.378	0.717	9.064
4 COAL MINES	0.972	1.690	0.291	3.987
5 PETROLEUM AND GAS WELLS	0.539	1.357	0.142	2.825
6 OTHER MINES AND QUARRIES	1.045	1.745	0.337	4.179
7 SERVICES INCIDENTAL TO MINING	1.197	1.843	0.372	4.741
8 MEAT AND POULTRY PRODUCTS INDUSTRY	1.141	1.892	0.470	6.059
9 DAIRY FACTORIES	1.162	1.922	0.453	5.609
10 MISC. FOOD INDUSTRIES	1.127	1.870	0.440	5.602
11 BEVERAGE INDUSTRIES	1.070	1.743	0.351	4.761
12 RUBBER INDUSTRIES	1.568	2.063	0.516	6.406
13 LEATHER INDUSTRIES	1.331	1.964	0.532	5.585
14 TEXTILE INDUSTRIES	1.090	1.771	0.381	4.959
15 CLOTHING INDUSTRIES	1.100	1.785	0.437	4.524
16 WOOD INDUSTRIES	1.316	1.929	0.429	5.326
17 FURNITURE AND FIXTURES INDUSTRIES	1.517	2.069	0.539	5.884
18 PAPER AND ALLIED INDUSTRIES	0.970	1.679	0.301	4.447
19 PRINTING AND PUBLISHING	1.197	1.850	0.414	4.619
20 PRIMARY METAL INDUSTRIES	0.870	1.472	0.262	4.067
21 METAL FABRICATING INDUSTRIES	1.235	1.839	0.407	4.941
22 MACHINERY INDUSTRIES	1.163	1.800	0.380	4.711
23 TRANSPORTATION EQUIPMENT INDUSTRIES	1.325	1.930	0.468	4.977
24 ELECTRICAL PRODUCTS INDUSTRIES	1.424	2.000	0.514	5.581
25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES	1.147	1.792	0.359	4.765
26 PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.794	1.774	0.215	4.782
27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	0.788	1.538	0.235	4.219
28 MISC. MANUFACTURING INDUSTRIES	1.194	1.843	0.426	5.003
29 CONSTRUCTION INDUSTRY	1.313	1.906	0.418	5.168
30 WHOLESALE AND RETAIL TRADE INDUSTRY	1.426	2.005	0.564	4.719
31 TRANSPORTATION AND STORAGE INDUSTRY	1.103	1.820	0.380	4.489
32 COMMUNICATIONS INDUSTRY	1.127	1.818	0.354	3.970
33 UTILITIES	0.845	1.907	0.215	3.296
34 FINANCE, INSURANCE AND REAL ESTATE	0.790	1.505	0.178	3.033
35 HEALTH AND HOSPITAL INDUSTRY	1.636	2.170	0.513	5.019
36 BUSINESS SERVICES INDUSTRY	1.482	2.059	0.488	4.767
37 ACCOMMODATION AND FOOD SERVICES INDUSTRY	1.271	1.891	0.585	4.765
38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY	1.222	1.860	0.560	4.334
39 DUMMY INDUSTRY I (1)	1.177	1.793	0.421	5.674
40 DUMMY INDUSTRY II (2)	1.106	1.726	0.406	5.225
41 TRANSPORTATION MARGINS (3)	1.101	1.822	0.379	5.480
42 HOUSEHOLDS (4)	0.813	1.310	0.292	4.103

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 6

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY DETAILED INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	0.561	1.037	0.299	2.836
2 FORESTRY	0.613	1.017	0.152	2.556
3 FISHING, HUNTING AND TRAPPING	1.362	1.940	0.402	5.410
4 COAL MINES	0.583	1.056	0.159	2.404
5 PETROLEUM AND GAS WELLS	0.313	0.978	0.069	1.921
6 OTHER MINES AND QUARRIES	0.644	1.098	0.196	2.557
7 SERVICES INCIDENTAL TO MINING	0.704	1.054	0.202	2.725
8 MEAT AND POULTRY PRODUCTS INDUSTRY	0.541	0.882	0.238	3.361
9 DAIRY FACTORIES	0.570	0.928	0.228	3.014
10 MISC. FOOD INDUSTRIES	0.514	0.843	0.210	2.886
11 BEVERAGE INDUSTRIES	0.500	0.829	0.154	2.356
12 RUBBER INDUSTRIES	0.751	0.713	0.240	2.804
13 LEATHER INDUSTRIES	0.702	0.937	0.302	2.857
14 TEXTILE INDUSTRIES	0.440	0.689	0.158	2.057
15 CLOTHING INDUSTRIES	0.528	0.864	0.233	2.072
16 WOOD INDUSTRIES	0.735	1.006	0.229	2.945
17 FURNITURE AND FIXTURES INDUSTRIES	0.718	0.844	0.264	2.572
18 PAPER AND ALLIED INDUSTRIES	0.468	0.860	0.132	2.325
19 PRINTING AND PUBLISHING	0.687	1.017	0.240	2.476
20 PRIMARY METAL INDUSTRIES	0.399	0.695	0.108	2.037
21 METAL FABRICATING INDUSTRIES	0.627	0.866	0.204	2.383
22 MACHINERY INDUSTRIES	0.549	0.824	0.174	2.171
23 TRANSPORTATION EQUIPMENT INDUSTRIES	0.702	0.955	0.254	2.446
24 ELECTRICAL PRODUCTS INDUSTRIES	0.582	0.727	0.219	2.249
25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES	0.612	0.908	0.179	2.526
26 PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.448	1.196	0.102	3.382
27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	0.388	0.840	0.103	2.498
28 MISC. MANUFACTURING INDUSTRIES	0.590	0.837	0.220	2.347
29 CONSTRUCTION INDUSTRY	0.717	0.965	0.212	2.748
30 WHOLESALE AND RETAIL TRADE INDUSTRY	0.999	1.318	0.413	2.984
31 TRANSPORTATION AND STORAGE INDUSTRY	0.648	1.084	0.221	2.642
32 COMMUNICATIONS INDUSTRY	0.762	1.240	0.224	2.505
33 UTILITIES	0.592	1.499	0.126	2.271
34 FINANCE, INSURANCE AND REAL ESTATE	0.558	1.130	0.096	2.099
35 HEALTH AND HOSPITAL INDUSTRY	1.180	1.440	0.350	3.161
36 BUSINESS SERVICES INDUSTRY	1.038	1.354	0.329	2.998
37 ACCOMMODATION AND FOOD SERVICES INDUSTRY	0.810	1.142	0.418	2.813
38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY	0.828	1.225	0.419	2.737
39 DUMMY INDUSTRY I (1)	0.304	0.434	0.119	2.091
40 DUMMY INDUSTRY II (2)	0.487	0.740	0.190	2.757
41 TRANSPORTATION MARGINS (3)	0.273	0.459	0.093	2.114
42 HOUSEHOLDS (4)	0.370	0.597	0.133	2.293

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 7

TOTAL MULTIPLIERS (RATIO FORM, WITHOUT LEAKAGES)
BY DETAILED INDUSTRY, 1984

INDUSTRY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 AGRICULTURE	4.952	4.530	2.998	4.958
2 FORESTRY	3.454	3.348	6.138	4.459
3 FISHING, HUNTING AND TRAPPING	3.494	4.654	4.757	9.064
4 COAL MINES	3.261	2.999	4.211	3.987
5 PETROLEUM AND GAS WELLS	5.449	2.301	9.815	2.825
6 OTHER MINES AND QUARRIES	3.362	3.110	4.279	4.179
7 SERVICES INCIDENTAL TO MINING	3.084	3.464	4.100	4.741
8 MEAT AND POULTRY PRODUCTS INDUSTRY	11.654	18.168	19.698	6.059
9 DAIRY FACTORIES	6.319	7.703	9.431	5.609
10 MISC. FOOD INDUSTRIES	7.739	9.134	9.949	5.602
11 BEVERAGE INDUSTRIES	4.402	4.244	5.664	4.761
12 RUBBER INDUSTRIES	3.775	13.821	4.065	6.406
13 LEATHER INDUSTRIES	3.762	5.242	3.121	5.585
14 TEXTILE INDUSTRIES	4.639	5.056	4.427	4.959
15 CLOTHING INDUSTRIES	3.378	3.302	2.734	4.524
16 WOOD INDUSTRIES	3.975	5.419	4.353	5.326
17 FURNITURE AND FIXTURES INDUSTRIES	3.793	5.897	3.574	5.884
18 PAPER AND ALLIED INDUSTRIES	4.566	3.870	6.406	4.447
19 PRINTING AND PUBLISHING	2.922	3.260	2.906	4.619
20 PRIMARY METAL INDUSTRIES	4.250	4.168	5.974	4.067
21 METAL FABRICATING INDUSTRIES	3.412	4.159	3.664	4.941
22 MACHINERY INDUSTRIES	3.585	3.870	3.954	4.711
23 TRANSPORTATION EQUIPMENT INDUSTRIES	3.127	3.748	3.030	4.977
24 ELECTRICAL PRODUCTS INDUSTRIES	4.273	5.911	3.938	5.581
25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES	3.572	4.340	4.438	4.765
26 PETROLEUM AND COAL PRODUCTS INDUSTRIES	16.325	53.897	33.415	4.782
27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	6.606	5.735	10.070	4.219
28 MISC. MANUFACTURING INDUSTRIES	3.556	4.380	3.239	5.003
29 CONSTRUCTION INDUSTRY	3.869	4.985	4.908	5.168
30 WHOLESALE AND RETAIL TRADE INDUSTRY	2.213	2.778	1.928	4.719
31 TRANSPORTATION AND STORAGE INDUSTRY	3.311	3.412	3.266	4.489
32 COMMUNICATIONS INDUSTRY	2.322	2.293	2.787	3.970
33 UTILITIES	2.375	1.743	4.309	3.296
34 FINANCE, INSURANCE AND REAL ESTATE	2.237	1.895	6.468	3.033
35 HEALTH AND HOSPITAL INDUSTRY	2.031	2.616	2.342	5.019
36 BUSINESS SERVICES INDUSTRY	2.210	2.688	2.440	4.767
37 ACCOMMODATION AND FOOD SERVICES INDUSTRY	2.656	3.214	1.964	4.765
38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY	2.410	2.675	1.813	4.334

TABLE 8

TOTAL MULTIPLIERS (RATIO FORM, WITH LEAKAGES)
BY DETAILED INDUSTRY, 1984

INDUSTRY	HOUSEHOLD	G.D.P.	EMPLOY-	GROSS
	INCOME	AT FACTOR COST	MENT	OUTPUT
1 AGRICULTURE	2.655	2.534	1.882	2.836
2 FORESTRY	1.962	1.926	2.974	2.556
3 FISHING, HUNTING AND TRAPPING	2.113	2.673	2.670	5.410
4 COAL MINES	1.955	1.874	2.303	2.404
5 PETROLEUM AND GAS WELLS	3.161	1.658	4.791	1.921
6 OTHER MINES AND QUARRIES	2.071	1.957	2.486	2.557
7 SERVICES INCIDENTAL TO MINING	1.814	1.981	2.221	2.725
8 MEAT AND POULTRY PRODUCTS INDUSTRY	5.530	8.470	9.983	3.361
9 DAIRY FACTORIES	3.097	3.718	4.740	3.014
10 MISC. FOOD INDUSTRIES	3.531	4.118	4.739	2.886
11 BEVERAGE INDUSTRIES	2.059	2.018	2.476	2.356
12 RUBBER INDUSTRIES	1.807	4.778	1.892	2.804
13 LEATHER INDUSTRIES	1.985	2.500	1.773	2.857
14 TEXTILE INDUSTRIES	1.872	1.967	1.831	2.057
15 CLOTHING INDUSTRIES	1.622	1.598	1.456	2.072
16 WOOD INDUSTRIES	2.221	2.827	2.329	2.945
17 FURNITURE AND FIXTURES INDUSTRIES	1.796	2.405	1.751	2.572
18 PAPER AND ALLIED INDUSTRIES	2.206	1.982	2.807	2.325
19 PRINTING AND PUBLISHING	1.677	1.792	1.680	2.476
20 PRIMARY METAL INDUSTRIES	1.948	1.968	2.461	2.037
21 METAL FABRICATING INDUSTRIES	1.734	1.959	1.834	2.383
22 MACHINERY INDUSTRIES	1.690	1.772	1.811	2.171
23 TRANSPORTATION EQUIPMENT INDUSTRIES	1.658	1.854	1.645	2.446
24 ELECTRICAL PRODUCTS INDUSTRIES	1.746	2.148	1.679	2.249
25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES	1.906	2.199	2.213	2.526
26 PETROLEUM AND COAL PRODUCTS INDUSTRIES	9.212	36.320	15.796	3.382
27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	3.253	3.134	4.409	2.498
28 MISC. MANUFACTURING INDUSTRIES	1.756	1.990	1.671	2.347
29 CONSTRUCTION INDUSTRY	2.113	2.524	2.493	2.748
30 WHOLESALE AND RETAIL TRADE INDUSTRY	1.551	1.825	1.413	2.984
31 TRANSPORTATION AND STORAGE INDUSTRY	1.945	2.032	1.901	2.642
32 COMMUNICATIONS INDUSTRY	1.571	1.564	1.763	2.505
33 UTILITIES	1.665	1.370	2.534	2.271
34 FINANCE, INSURANCE AND REAL ESTATE	1.580	1.423	3.493	2.099
35 HEALTH AND HOSPITAL INDUSTRY	1.465	1.735	1.600	3.161
36 BUSINESS SERVICES INDUSTRY	1.548	1.768	1.647	2.998
37 ACCOMMODATION AND FOOD SERVICES INDUSTRY	1.694	1.940	1.402	2.813
38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY	1.632	1.762	1.359	2.737

TABLES

TOTAL MULTIPLIERS BY COMMODITY

TABLE 9

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY MAJOR COMMODITY, 1984

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 LIVE ANIMALS	1.028	1.857	0.452	4.970
2 GRAINS	1.028	1.857	0.452	4.970
3 OTHER AGRICULTURAL PRODUCTS	1.028	1.856	0.451	4.969
4 FISHING AND TRAPPING PRODUCTS	2.179	3.345	0.659	8.978
5 FORESTRY PRODUCTS	1.037	1.766	0.299	4.495
6 MINERAL FUELS	0.569	1.390	0.147	2.974
7 NON-METALLIC MINERALS	0.585	1.406	0.154	3.049
8 PRODUCTS RELATING TO MINES	0.568	1.390	0.147	2.969
9 MEAT, FISH AND DAIRY PRODUCTS	0.990	1.801	0.319	5.055
10 FRUIT, VEG., FEED & MISC. FOOD PROD.	1.004	1.807	0.324	5.044
11 BEVERAGES	0.984	1.797	0.314	5.061
12 RUBBER, LEATHER, PLASTIC FAB. PROD.	0.987	1.799	0.316	5.059
13 TEXTILE PRODUCTS	0.988	1.799	0.316	5.058
14 KNITTED PRODUCTS AND CLOTHING	0.991	1.801	0.318	5.055
15 LUMBER, SAWMILL, OTHER WOOD PROD.	0.999	1.804	0.322	5.048
16 FURNITURE AND FIXTURES	0.986	1.798	0.315	5.060
17 PAPER AND PAPER PRODUCTS	0.988	1.799	0.316	5.058
18 PRINTING AND PUBLISHING	0.985	1.797	0.314	5.061
19 PRIMARY METAL PRODUCTS	0.986	1.798	0.315	5.060
20 METAL FABRICATING PRODUCTS	0.988	1.799	0.316	5.058
21 MACHINERY AND EQUIPMENT	0.948	1.759	0.301	4.839
22 AUTOS, TRUCKS, OTHER TRANS. EQUIP.	1.009	1.804	0.327	4.954
23 ELECTRICAL AND COMMUNICATIONS PROD.	1.022	1.807	0.325	4.809
24 NON-METALLIC MINERAL PRODUCTS	0.985	1.797	0.314	5.061
25 PETROLEUM AND COAL PRODUCTS	0.872	1.687	0.269	4.496
26 CHEMICALS AND CHEMICAL PRODUCTS	0.988	1.801	0.322	5.051
27 MISC. MANUFACTURED PRODUCTS	1.001	1.805	0.323	5.046
28 CONSTRUCTION	1.159	1.836	0.355	4.954
29 WHOLESALE AND RETAIL TRADE	1.373	1.988	0.526	4.706
30 TRANSPORTATION AND STORAGE	1.070	1.805	0.358	4.447
31 COMMUNICATION SERVICES	1.086	1.806	0.325	3.951
32 OTHER UTILITIES	0.792	1.875	0.188	3.218
33 REAL ESTATE RENT	0.776	1.506	0.167	3.055
34 FINANCE, INSURANCE AND REAL ESTATE	0.755	1.492	0.161	3.018
35 BUSINESS, PERSONAL & OTHER MISC. SVCS	1.299	1.937	0.493	4.575
36 DUMMY COMMODITY I (1)	1.043	1.778	0.355	5.762
37 DUMMY COMMODITY II (2)	1.043	1.706	0.361	5.248
38 TRANSPORTATION MARGINS (3)	1.070	1.805	0.358	5.447
39 HOUSEHOLD SERVICES (4)	0.768	1.297	0.255	4.070

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 10

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY MAJOR COMMODITY, 1984

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 LIVE ANIMALS	0.456	0.831	0.240	2.247
2 GRAINS	0.433	0.789	0.228	2.132
3 OTHER AGRICULTURAL PRODUCTS	0.421	0.768	0.221	2.077
4 FISHING AND TRAPPING PRODUCTS	0.129	0.181	0.037	0.501
5 FORESTRY PRODUCTS	0.556	0.930	0.145	2.347
6 MINERAL FUELS	0.343	0.984	0.079	1.981
7 NON-METALLIC MINERALS	0.110	0.310	0.026	0.635
8 PRODUCTS RELATING TO MINES	0.339	0.972	0.078	1.955
9 MEAT, FISH AND DAIRY PRODUCTS	0.388	0.717	0.123	2.135
10 FRUIT, VEG., FEED & MISC. FOOD PROD.	0.203	0.367	0.065	1.081
11 BEVERAGES	0.273	0.507	0.085	1.521
12 RUBBER, LEATHER, PLASTIC FAB. PROD.	0.096	0.177	0.030	0.530
13 TEXTILE PRODUCTS	0.043	0.079	0.013	0.236
14 KNITTED PRODUCTS AND CLOTHING	0.030	0.056	0.009	0.166
15 LUMBER, SAWMILL, OTHER WOOD PROD.	0.268	0.488	0.085	1.446
16 FURNITURE AND FIXTURES	0.128	0.237	0.040	0.710
17 PAPER AND PAPER PRODUCTS	0.109	0.202	0.034	0.603
18 PRINTING AND PUBLISHING	0.280	0.521	0.087	1.561
19 PRIMARY METAL PRODUCTS	0.115	0.214	0.036	0.641
20 METAL FABRICATING PRODUCTS	0.120	0.222	0.037	0.662
21 MACHINERY AND EQUIPMENT	0.072	0.138	0.022	0.396
22 AUTOS, TRUCKS, OTHER TRANS. EQUIP.	0.020	0.036	0.006	0.103
23 ELECTRICAL AND COMMUNICATIONS PROD.	0.038	0.067	0.012	0.181
24 NON-METALLIC MINERAL PRODUCTS	0.208	0.386	0.065	1.155
25 PETROLEUM AND COAL PRODUCTS	0.416	0.856	0.123	2.333
26 CHEMICALS AND CHEMICAL PRODUCTS	0.213	0.396	0.069	1.177
27 MISC. MANUFACTURED PRODUCTS	0.065	0.118	0.021	0.348
28 CONSTRUCTION	0.666	0.966	0.194	2.672
29 WHOLESALE AND RETAIL TRADE	0.882	1.171	0.358	2.655
30 TRANSPORTATION AND STORAGE	0.276	0.455	0.093	1.095
31 COMMUNICATION SERVICES	0.758	1.235	0.218	2.487
32 OTHER UTILITIES	0.436	1.135	0.089	1.706
33 REAL ESTATE RENT	0.511	1.029	0.089	1.918
34 FINANCE, INSURANCE AND REAL ESTATE	0.405	0.834	0.069	1.551
35 BUSINESS, PERSONAL & OTHER MISC. SVCS	0.655	0.907	0.263	2.044
36 DUMMY COMMODITY I (1)	0.304	0.460	0.114	2.193
37 DUMMY COMMODITY II (2)	0.443	0.686	0.159	2.636
38 TRANSPORTATION MARGINS (3)	0.276	0.455	0.093	2.095
39 HOUSEHOLD SERVICES (4)	0.370	0.602	0.125	2.282

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 11

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY DETAILED COMMODITY, 1984

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 LIVE ANIMALS	1.046	1.854	0.477	4.958
2 GRAINS	1.046	1.854	0.477	4.958
3 OTHER AGRICULTURAL PRODUCTS	1.046	1.854	0.476	4.960
4 FISHING AND TRAPPING PRODUCTS	2.252	3.378	0.717	9.064
5 FORESTRY PRODUCTS	1.086	1.780	0.328	4.511
6 COAL	0.972	1.690	0.291	3.987
7 CRUDE MINERAL OILS	0.539	1.357	0.142	2.825
8 NATURAL GAS	0.541	1.360	0.143	2.841
9 NON-METALLIC MINERALS	0.671	1.458	0.193	3.199
10 SERVICES INCIDENTAL TO MINING	1.197	1.843	0.372	4.741
11 MEAT PRODUCTS	1.143	1.892	0.471	6.004
12 DAIRY PRODUCTS	1.163	1.922	0.453	5.608
13 FISH PRODUCTS	1.127	1.870	0.440	5.602
14 FRUITS AND VEGETABLES PREPARATIONS	1.139	1.876	0.444	5.554
15 FEEDS	1.131	1.871	0.442	5.589
16 FLOUR MILL PRODUCTS	1.127	1.870	0.440	5.602
17 BREAKFAST CEREAL & BAKERY PROD.	1.184	1.896	0.464	5.432
18 SUGAR & MOLASSES	1.127	1.870	0.440	5.602
19 MISC. FOOD PRODUCTS	1.139	1.875	0.445	5.565
20 BEVERAGES	1.070	1.743	0.352	4.763
21 TIRES AND TUBES	1.563	2.061	0.517	6.352
22 OTHER RUBBER PRODUCTS	1.563	2.060	0.514	6.390
23 PLASTIC FABRICATED PRODUCTS	1.153	1.810	0.405	4.924
24 LEATHER & LEATHER PRODUCTS	1.305	1.944	0.521	5.464
25 TEXTILE PRODUCTS	1.096	1.774	0.384	4.956
26 KNITTED PRODUCTS & CLOTHING	1.114	1.795	0.441	4.572
27 LUMBER & TIMBER	1.322	1.933	0.437	5.289
28 VENEER & PLYWOOD	1.315	1.928	0.429	5.324
29 OTHER WOOD PRODUCTS	1.314	1.926	0.430	5.302
30 FURNITURE & FIXTURES	1.479	2.042	0.521	5.779
31 PULP	0.970	1.679	0.301	4.447
32 PAPER & PAPER PRODUCTS	1.017	1.713	0.327	4.534
33 PRINTING & PUBLISHING	1.198	1.850	0.415	4.620
34 IRON & STEEL PRODUCTS	0.901	1.502	0.275	4.138
35 NON FERROUS METAL PROD.	0.871	1.473	0.263	4.071
36 BOILERS, TANKS & PLATES	1.218	1.830	0.401	4.888
37 FABRICATED STRUCTURAL METAL PROD.	1.222	1.827	0.402	4.907
38 OTHER METAL FABRICATED PROD.	1.227	1.833	0.406	4.914

TABLE 11

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY DETAILED COMMODITY, 1984 - CONTINUED

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
39 AGRICULTURAL MACHINERY	1.186	1.817	0.394	4.734
40 OTHER INDUSTRIAL MACHINERY	1.128	1.771	0.367	4.603
41 MOTOR VEHICLES	1.320	1.926	0.466	4.967
42 MOTOR VEHICLE PARTS	1.279	1.882	0.439	4.931
43 OTHER TRANSPORTATION EQUIPMENT	1.203	1.870	0.420	4.704
44 APPLIANCES & RECEIVERS, HOUSEHOLD	1.376	1.970	0.524	4.959
45 OTHER ELEC. PRODUCTS	1.350	1.954	0.476	5.179
46 CEMENT & CONCRETE PRODUCTS	1.147	1.792	0.359	4.765
47 OTHER NON-METALLIC MINERAL PROD.	1.149	1.794	0.361	4.767
48 GASOLINE	0.794	1.774	0.215	4.782
49 FUEL OIL	0.794	1.774	0.215	4.782
50 LUBRICATING OIL & GREASE	0.794	1.774	0.215	4.781
51 OTHER PETROLEUM & COAL PROD.	0.600	1.450	0.161	3.265
52 FERTILIZERS	1.021	1.824	0.454	4.888
53 PHARMACEUTICALS	0.818	1.560	0.250	4.243
54 INORGANIC CHEMICALS	0.803	1.531	0.240	4.197
55 ORGANIC CHEMICALS	0.788	1.538	0.235	4.220
56 INDUSTRIAL CHEMICAL PROD.	0.808	1.529	0.242	4.198
57 OTHER CHEMICAL PROD.	0.850	1.595	0.271	4.432
58 SCIENCE & LABORATORY EQUIP.	1.200	1.846	0.429	4.999
59 MISC. MANUFACTURED PRODUCTS	1.157	1.810	0.406	4.867
60 CONSTRUCTION	1.313	1.906	0.418	5.168
61 WHOLESALE & RETAIL TRADE	1.410	1.995	0.558	4.711
62 TRANSPORTATION & STORAGE	1.101	1.822	0.379	4.480
63 RADIO & TELEVISION BROADCASTING	1.127	1.818	0.354	3.970
64 TELEPHONE & TELEGRAPH	1.127	1.818	0.354	3.970
65 POSTAL SERVICES	1.127	1.818	0.354	3.970
66 ELECTRIC POWER	0.845	1.907	0.215	3.296
67 OTHER UTILITIES	0.842	1.901	0.215	3.368
68 REAL ESTATE RENT	0.799	1.513	0.184	3.071
69 FINANCE, INSURANCE & REAL ESTATE	0.775	1.496	0.176	3.024
70 HEALTH & HOSPITAL SERVICES	1.636	2.170	0.513	5.019
71 BUSINESS SERVICES	1.472	2.053	0.485	4.751
72 ACCOMMODATION & MEALS	1.273	1.893	0.583	4.757
73 OTHER PERSONAL & MISC. SERVICES	1.192	1.837	0.518	4.257
74 DUMMY COMMODITY I (1)	1.177	1.793	0.421	5.674
75 DUMMY COMMODITY II (2)	1.106	1.726	0.406	5.225
76 TRANSPORTATION MARGINS (3)	1.101	1.822	0.379	5.480
77 HOUSEHOLD SERVICES (4)	0.813	1.310	0.292	4.103

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TABLE 12

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY DETAILED COMMODITY, 1984

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
1 LIVE ANIMALS	0.468	0.866	0.250	2.368
2 GRAINS	0.444	0.822	0.237	2.247
3 OTHER AGRICULTURAL PRODUCTS	0.432	0.799	0.230	2.188
4 FISHING AND TRAPPING PRODUCTS	0.128	0.183	0.038	0.510
5 FORESTRY PRODUCTS	0.563	0.933	0.150	2.361
6 COAL	0.583	1.056	0.159	2.403
7 CRUDE MINERAL OILS	0.313	0.978	0.069	1.921
8 NATURAL GAS	0.312	0.974	0.069	1.922
9 NON-METALLIC MINERALS	0.125	0.316	0.032	0.658
10 SERVICES INCIDENTAL TO MINING	0.694	1.039	0.199	2.688
11 MEAT PRODUCTS	0.431	0.701	0.190	2.622
12 DAIRY PRODUCTS	0.407	0.662	0.163	2.151
13 FISH PRODUCTS	0.000	0.000	0.000	0.000
14 FRUITS AND VEGETABLES PREPARATIONS	0.039	0.063	0.016	0.209
15 FEEDS	0.440	0.718	0.180	2.439
16 FLOUR MILL PRODUCTS	0.290	0.476	0.118	1.629
17 BREAKFAST CEREAL & BAKERY PROD.	0.234	0.360	0.096	1.119
18 SUGAR & MOLASSES	0.399	0.655	0.163	2.242
19 MISC. FOOD PRODUCTS	0.122	0.197	0.050	0.661
20 BEVERAGES	0.266	0.440	0.082	1.251
21 TIRES AND TUBES	0.060	0.058	0.019	0.222
22 OTHER RUBBER PRODUCTS	0.017	0.016	0.005	0.063
23 PLASTIC FABRICATED PRODUCTS	0.210	0.309	0.076	0.873
24 LEATHER & LEATHER PRODUCTS	0.029	0.040	0.013	0.119
25 TEXTILE PRODUCTS	0.037	0.058	0.013	0.171
26 KNITTED PRODUCTS & CLOTHING	0.031	0.050	0.014	0.122
27 LUMBER & TIMBER	0.325	0.444	0.104	1.276
28 VENEER & PLYWOOD	0.128	0.176	0.040	0.514
29 OTHER WOOD PRODUCTS	0.447	0.611	0.140	1.777
30 FURNITURE & FIXTURES	0.176	0.212	0.064	0.641
31 PULP	0.082	0.151	0.023	0.408
32 PAPER & PAPER PRODUCTS	0.108	0.186	0.033	0.502
33 PRINTING & PUBLISHING	0.375	0.554	0.131	1.349
34 IRON & STEEL PRODUCTS	0.094	0.160	0.026	0.465
35 NON FERROUS METAL PROD.	0.085	0.148	0.023	0.434
36 BOILERS, TANKS & PLATES	0.311	0.437	0.100	1.192
37 FABRICATED STRUCTURAL METAL PROD.	0.277	0.386	0.090	1.063
38 OTHER METAL FABRICATED PROD.	0.078	0.108	0.025	0.297

TABLE 12

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY DETAILED COMMODITY, 1984 – CONTINUED

COMMODITY	HOUSEHOLD INCOME	G.D.P. AT FACTOR COST	EMPLOY- MENT	GROSS OUTPUT
39 AGRICULTURAL MACHINERY	0.021	0.031	0.007	0.081
40 OTHER INDUSTRIAL MACHINERY	0.090	0.139	0.028	0.362
41 MOTOR VEHICLES	0.015	0.021	0.005	0.053
42 MOTOR VEHICLE PARTS	0.033	0.045	0.012	0.119
43 OTHER TRANSPORTATION EQUIPMENT	0.041	0.063	0.015	0.157
44 APPLIANCES & RECEIVERS, HOUSEHOLD	0.011	0.015	0.004	0.036
45 OTHER ELEC. PRODUCTS	0.055	0.074	0.019	0.201
46 CEMENT & CONCRETE PRODUCTS	0.294	0.436	0.086	1.213
47 OTHER NON-METALLIC MINERAL PROD.	0.149	0.221	0.044	0.614
48 GASOLINE	0.423	1.130	0.096	3.196
49 FUEL OIL	0.403	1.075	0.091	3.041
50 LUBRICATING OIL & GREASE	0.273	0.729	0.062	2.063
51 OTHER PETROLEUM & COAL PROD.	0.276	0.818	0.062	1.791
52 FERTILIZERS	0.348	0.652	0.180	1.796
53 PHARMACEUTICALS	0.004	0.008	0.001	0.023
54 INORGANIC CHEMICALS	0.228	0.477	0.061	1.412
55 ORGANIC CHEMICALS	0.309	0.669	0.082	1.988
56 INDUSTRIAL CHEMICAL PROD.	0.150	0.310	0.040	0.919
57 OTHER CHEMICAL PROD.	0.068	0.137	0.020	0.415
58 SCIENCE & LABORATORY EQUIP.	0.104	0.148	0.039	0.412
59 MISC. MANUFACTURED PRODUCTS	0.053	0.077	0.019	0.214
60 CONSTRUCTION	0.717	0.965	0.212	2.748
61 WHOLESALE & RETAIL TRADE	0.878	1.167	0.364	2.654
62 TRANSPORTATION & STORAGE	0.273	0.459	0.093	1.114
63 RADIO & TELEVISION BROADCASTING	0.751	1.221	0.220	2.466
64 TELEPHONE & TELEGRAPH	0.760	1.237	0.223	2.498
65 POSTAL SERVICES	0.730	1.187	0.214	2.398
66 ELECTRIC POWER	0.548	1.386	0.117	2.100
67 OTHER UTILITIES	0.274	0.694	0.058	1.087
68 REAL ESTATE RENT	0.509	1.024	0.091	1.917
69 FINANCE, INSURANCE & REAL ESTATE	0.402	0.830	0.070	1.547
70 HEALTH & HOSPITAL SERVICES	0.985	1.202	0.292	2.639
71 BUSINESS SERVICES	0.676	0.885	0.214	1.959
72 ACCOMMODATION & MEALS	0.804	1.132	0.411	2.779
73 OTHER PERSONAL & MISC. SERVICES	0.434	0.655	0.206	1.450
74 DUMMY COMMODITY I (1)	0.304	0.434	0.119	2.091
75 DUMMY COMMODITY II (2)	0.487	0.740	0.190	2.757
76 TRANSPORTATION MARGINS (3)	0.273	0.459	0.093	2.114
77 HOUSEHOLD SERVICES (4)	0.370	0.597	0.133	2.293

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

FOOTNOTES

- (1) The dummy industry and commodity technique is used in input-output tables to deal with "catch-all" categories of inputs reported by establishments. For example, dummy industry I contains office supplies. Instead of finding the commodity content (paper, pencils, paper clips, etc.) of office supplies for each industry, it is estimated for one industry called "office supplies" whose output is equal to the total purchases of office supplies by all industries. Also included in dummy industry I are four other similar inputs - operating supplies, cafeteria requirements, laboratory supplies and machinery repair services.

Corresponding to each dummy industry, there is one dummy commodity. Thus, office supplies, operating supplies, cafeteria requirements, laboratory supplies and machinery repair services are included in dummy commodity I in all commodity tables.

- (2) Dummy industry II includes two additional dummy industries - travel and entertainment, and advertising and promotion. Corresponding dummy commodities are included in dummy commodity II in commodity tables.
- (3) The transportation margins dummy industry and commodity technique is used in input-output tables to deal with the transportation cost associated with the movement of commodities from point of production to purchasers. All such transportation costs are called transportation margins which are paid by purchasers. It is difficult to identify these transportation costs by type of transport (e.g., air transport, rail transport, truck transport, etc.) for each commodity and for each industry. Therefore, all these transportation margins are routed through a dummy industry called "transportation margins". This dummy industry purchases all types of transport from the transportation industry and produces the dummy commodity - "transportation margin" which is allocated by commodity for each industry and final demand category.

- (4) "Households" is an industry when the model is closed with respect to households to examine the feedback effects of spending the additional income generated in the production process. "Households" consists of persons, unincorporated businesses and non-profit organizations. The inputs of this industry are the commodities in the personal expenditure column. The output of this industry is "household services" which appears in commodity tables. "Household services" consist of labour and capital services provided by households.

APPENDICES

APPENDIX I

DATA SOURCES

Most of the detailed data required for the calculation of multipliers are contained in 1984 Alberta Input-Output Tables. Additional data requirements and sources used are listed below.

1. **Employment by Industry:** To calculate employment multipliers data on employment - paid and other than paid workers - by industry are obtained from the Input-Output Division, Statistics Canada.

2. **Personal Income:** Data about Personal Income and Outlay components are required to close the model and to calculate household income multipliers. These data are obtained from **Alberta Economic Accounts, 1988**, (Table 7), published by the Bureau. Household income is treated as the sum of wages, salaries and supplementary labour income, military pay and allowances, net income of unincorporated business, interest, dividends and miscellaneous investment income and current transfers to persons. The distribution of the first three components by industry is available in the 1984 input-output tables. Transfers to persons fall outside the production system, thus is not included in GDP. Industrial distribution of interest, dividends, and miscellaneous investment income is obtained in two steps: (a) wherever possible, the different components of this item are allocated to industries using the worksheet details available in the personal sector of **Alberta Economic Accounts**; and (b) the remainder of the total after the first step is allocated to industries using operating surplus as an allocator.

APPENDIX II

METHODOLOGY

The input-output model, when used to study the effects on the economy of a change in the final demand, becomes an impact, or multiplier model. Details about deriving impact tables from input-output tables and the mathematical description of the open input-output model were provided in an earlier Bureau publication on 1974 Alberta input-output tables. This appendix presents, in non-technical terms, the methodology employed to calculate the four types of multipliers included in this report.

In simple terms, the methodology employed to derive multipliers consists of two steps: (a) deriving a total requirements table for a dollar increase in final demand, or a dollar increase in production and (b) applying direct factor coefficients to the total requirements table to obtain multipliers. The total requirements table is the basis for calculation of all multipliers. This table presents the direct and indirect effects on industry outputs of a dollar increase in final demand or a dollar increase in production. For example, a dollar increase in agricultural production creates demand for all industry outputs the agriculture industry is purchasing to produce the additional dollar of output. This necessitates an increase in the production of all those industries supplying inputs to the agriculture industry. They, in turn, increase the demand for outputs of their suppliers. This process continues until the economy reaches an equilibrium position, i.e., where supply equals demand. In this equilibrium position, the level of the agriculture industry's output is determined by the direct and indirect effects of a dollar increase in the final sales of the agriculture industry's output. All these effects can be expressed using the technology matrix B , which provides the direct requirements to produce one dollar of output of each industry. The matrix $(I-B)$ is called the Leontief matrix, where I is an identity matrix with appropriate dimensions. The inverse of $(I-B)$ provides the total requirements table in a simple case of an industry by industry input-output table. Each column in the inverse of $(I-B)$ provides the direct and indirect requirements of industry outputs from one dollar increase in the final sales of the output of the industry corresponding to that column. The column sum gives the "output multiplier" for the industry corresponding to that column.

From this output base, we can move to any other category with the direct and indirect effects on industry outputs. For example, employment multipliers are calculated by multiplying the employee-output coefficients of industries with the entries in each column of the total requirements table. This basic procedure is repeated to calculate other types of multipliers. Specifically, all multiplier results presented in this report are expressed in terms of the following:

- (a) **Household Income:** This is the sum of wages, salaries and supplementary labour income; military pay and allowances; net income of unincorporated business; interest, dividends and miscellaneous investment income.
- (b) **GDP at factor cost:** This is the sum of wages, salaries and supplementary labour income; military pay and allowances; net income of unincorporated business; inventory valuation adjustment and operating surplus, which includes profits, investment income, and capital consumption allowances.
- (c) **Employment:** This is the number of paid and non-paid workers (self employed etc.).
- (d) **Gross Output:** This equals shipments adjusted for inventory change.

For items (a), (b) and (d) above, the direct coefficients are calculated by dividing each category with the industry's total output. Employment is expressed as the number of workers per \$10,000 (constant 1984 dollars) of total output. This point should be remembered when interpreting the employment multipliers given in the tables.

The multiplier tables presented in this report have been derived using the closed input-output model, with and without leakages from domestic production. As stated earlier in the report, multipliers based on the open model are available on request. The distinctions between open and closed models and the method of closing the model with respect to households are explained next.

Open Input-Output Model

In this model, all the categories of final demand are treated outside the production system. Any autonomous increase in final demand is directed to the production system and the resulting equilibrium levels of outputs are calculated. In this model, the analysis of the level of income is incomplete, that is, the analysis stops at the point where demand and supply are satisfied. But, in fact, the productive activity by industries generates income which, in turn, stimulates additional final expenditure. This is not captured in the open model. Given a change in final demand, the open model is capable of evaluating only the direct and indirect effects on output requirements. Only part of the overall impact of a given change in final demand can be evaluated from an open model. Therefore, the multipliers derived using an open input-output model are treated as lower limits of actual multipliers and are designated as "Simple Multipliers".

Closed Input-Output Model

In this model, one or more of the categories of final demand are included in the production system. The closed model takes into account both the impact of demand on supply and of supply on demand. This means that the equilibrium output levels calculated from a closed model incorporate not only the outputs required to meet a given final demand, but also the outputs required to meet the change in final demand which is induced by changes in production and income. In other words, the closed model is capable of evaluating the direct, indirect and induced effects on output requirements of a change in final demand. The multipliers based on the closed model are closer to actual multipliers and are identified by the term "Total Multipliers".

As stated above, an input-output model may be closed with respect to one or more of the final demand categories. In this report, the model is closed with respect to households only. This is accomplished by adding another industry (households) column and another commodity (household services) row to the "Use" matrix. The inputs of the household industry consist of goods and services in the personal expenditure column in the final

demand matrix. The level of household industry activity is given by total personal income. Households produce labour and capital services which are purchased by other industries and governments. The household services row consists of household incomes received from each industry. Similarly, the "Production" matrix is augmented by adding a "household services" commodity column and a "households" industry row. No other industry in the "Production" matrix produces household services and "households" industry produces no other commodity except household services. These augmented "Use" and "Production" matrices are employed in deriving the multipliers based on closed models.

APPENDIX III

1984 and 1979 COMPARISON

The following tables provide comparisons of the 1984 and 1979 multipliers. In most cases, the 1984 values are slightly higher than the 1979 values. The main contributing factor for this is the 1984 economy achieving more value added in the production process. GDP at factor cost constituted 52 per cent of the total production in 1984 whereas the proportion for 1979 is 49 per cent. Another contributing factor is higher induced income effect caused by more spending by persons in an economy coming out of 1982 recession.

Comparisons are made for household income, GDP at factor cost and gross output multipliers. Employment multipliers are not strictly comparable unless the output is deflated to 1979 dollars. In the case of industry multipliers, 1984 values are higher in most cases than 1979 values. It is only in the case of gross output multipliers, the change is slightly higher than the other two types. In the case of commodity multipliers (with leakages from both intermediate and final demand stages) the 1984 values are higher for majority of commodities. However, the difference is considerably reduced due to the import leakages from final demand. The significant difference to be noted is the 1984 gross output multipliers for most services are less than the 1979 values. This is due to increased imports of services in 1984.

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY DETAILED INDUSTRY: A COMPARISON OF 1984 AND 1979

INDUSTRY	HOUSEHOLD INCOME			G.D.P. AT FACTOR COST			GROSS OUTPUT		
	1984	1979	DIFF.	1984	1979	DIFF.	1984	1979	DIFF.
1 AGRICULTURE	0.561	0.648	-0.087	1.037	1.107	-0.070	2.836	2.656	0.180
2 FORESTRY	0.613	0.890	-0.277	1.017	1.070	-0.053	2.556	3.284	-0.728
3 FISHING, HUNTING AND TRAPPING	1.362	0.487	0.875	1.940	1.051	0.889	5.410	1.983	3.427
4 COAL MINES	0.583	0.477	0.106	1.056	1.018	0.038	2.404	2.290	0.114
5 PETROLEUM AND GAS WELLS	0.313	0.278	0.035	0.978	0.948	0.030	1.921	1.978	-0.057
6 OTHER MINES AND QUARRIES	0.644	0.454	0.190	1.098	1.037	0.061	2.557	2.264	0.293
7 SERVICES INCIDENTAL TO MINING	0.704	0.618	0.086	1.054	1.028	0.026	2.725	2.639	0.086
8 MEAT AND POULTRY PRODUCTS INDUSTRY	0.541	0.617	-0.076	0.882	0.980	-0.098	3.361	3.424	-0.063
9 DAIRY FACTORIES	0.570	0.601	-0.031	0.928	0.927	0.001	3.014	2.923	0.091
10 MISC. FOOD INDUSTRIES	0.514	0.504	0.010	0.843	0.834	0.009	2.886	2.734	0.152
11 BEVERAGE INDUSTRIES	0.500	0.480	0.020	0.829	0.884	-0.055	2.356	2.345	0.011
12 RUBBER INDUSTRIES	0.751	0.610	0.141	0.713	0.846	-0.133	2.804	2.417	0.387
13 LEATHER INDUSTRIES	0.702	0.606	0.096	0.937	0.916	0.021	2.857	3.348	-0.491
14 TEXTILE INDUSTRIES	0.440	0.371	0.069	0.689	0.648	0.041	2.057	1.918	0.139
15 CLOTHING INDUSTRIES	0.528	0.522	0.006	0.864	0.910	-0.046	2.072	2.077	-0.005
16 WOOD INDUSTRIES	0.735	0.613	0.122	1.006	0.918	0.088	2.945	2.636	0.309
17 FURNITURE AND FIXTURES INDUSTRIES	0.718	0.491	0.227	0.844	0.881	-0.037	2.572	2.160	0.412
18 PAPER AND ALLIED INDUSTRIES	0.468	0.474	-0.006	0.860	0.837	0.023	2.325	2.405	-0.080
19 PRINTING AND PUBLISHING	0.687	0.733	-0.046	1.017	0.964	0.053	2.476	2.680	-0.204
20 PRIMARY METAL INDUSTRIES	0.399	0.361	0.038	0.695	0.685	0.010	2.037	1.952	0.085
21 METAL FABRICATING INDUSTRIES	0.627	0.553	0.074	0.866	0.835	0.031	2.383	2.289	0.094
22 MACHINERY INDUSTRIES	0.549	0.540	0.009	0.824	0.831	-0.007	2.171	2.268	-0.097
23 TRANSPORTATION EQUIPMENT INDUSTRIES	0.702	0.548	0.154	0.955	0.717	0.238	2.446	2.304	0.142
24 ELECTRICAL PRODUCTS INDUSTRIES	0.582	0.589	-0.007	0.727	0.724	0.003	2.249	2.322	-0.073
25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES	0.612	0.523	0.089	0.908	0.939	-0.031	2.526	2.554	-0.028
26 PETROLEUM AND COAL PRODUCTS INDUSTRIES	0.448	0.330	0.118	1.196	0.905	0.291	3.382	2.890	0.492
27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES	0.388	0.352	0.036	0.840	0.829	0.011	2.498	2.220	0.278
28 MISC. MANUFACTURING INDUSTRIES	0.590	0.527	0.063	0.837	0.794	0.043	2.347	2.274	0.073
29 CONSTRUCTION INDUSTRY	0.717	0.636	0.081	0.965	0.911	0.054	2.748	2.680	0.068
30 WHOLESALE AND RETAIL TRADE INDUSTRY	0.999	0.851	0.148	1.318	1.228	0.090	2.984	2.930	0.054
31 TRANSPORTATION AND STORAGE INDUSTRY	0.648	0.608	0.040	1.084	1.023	0.061	2.642	2.645	-0.003
32 COMMUNICATIONS INDUSTRY	0.762	0.693	0.069	1.240	1.244	-0.004	2.505	2.437	0.068
33 UTILITIES	0.592	0.650	-0.058	1.499	1.433	0.066	2.271	2.430	-0.159
34 FINANCE, INSURANCE AND REAL ESTATE	0.558	0.421	0.137	1.130	1.027	0.103	2.099	1.985	0.114
35 HEALTH AND HOSPITAL INDUSTRY	1.180	0.876	0.304	1.440	1.284	0.156	3.161	2.817	0.344
36 BUSINESS SERVICES INDUSTRY	1.038	1.132	-0.094	1.354	1.432	-0.078	2.998	3.181	-0.183
37 ACCOMMODATION AND FOOD SERVICES INDUSTRY	0.810	0.741	0.069	1.142	1.101	0.041	2.813	2.888	-0.075
38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY	0.828	0.630	0.198	1.225	1.090	0.135	2.737	2.654	0.083
39 DUMMY INDUSTRY I (1)	0.304	0.324	-0.020	0.434	0.481	-0.047	2.091	2.229	-0.138
40 DUMMY INDUSTRY II (2)	0.487	0.442	0.045	0.740	0.686	0.054	2.757	2.735	0.022
41 TRANSPORTATION MARGINS (3)	0.273	0.377	-0.104	0.459	0.636	-0.177	2.114	2.642	-0.528
42 HOUSEHOLDS (4)	0.370	0.345	0.025	0.597	0.597	0.000	2.293	2.364	-0.071

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY MAJOR COMMODITY: A COMPARISON OF 1984 AND 1979

COMMODITY	HOUSEHOLD INCOME			G.D.P. AT FACTOR COST			GROSS OUTPUT		
	1984	1979	DIFF.	1984	1979	DIFF.	1984	1979	DIFF.
1 LIVE ANIMALS	0.456	0.569	-0.113	0.831	0.964	-0.133	2.247	2.270	-0.023
2 GRAINS	0.433	0.519	-0.086	0.789	0.878	-0.089	2.132	2.069	0.063
3 OTHER AGRICULTURAL PRODUCTS	0.421	0.457	-0.036	0.768	0.774	-0.006	2.077	1.829	0.248
4 FISHING AND TRAPPING PRODUCTS	0.129	0.076	0.053	0.181	0.164	0.017	0.501	0.308	0.193
5 FORESTRY PRODUCTS	0.556	0.596	-0.04	0.930	0.745	0.185	2.347	2.230	0.117
6 MINERAL FUELS	0.343	0.312	0.031	0.984	0.955	0.029	1.981	2.037	-0.056
7 NON-METALLIC MINERALS	0.110	0.071	0.039	0.310	0.185	0.125	0.635	0.432	0.203
8 PRODUCTS RELATING TO MINES	0.339	0.313	0.026	0.972	0.959	0.013	1.955	2.044	-0.089
9 MEAT, FISH AND DAIRY PRODUCTS	0.388	0.400	-0.012	0.717	0.704	0.013	2.135	2.113	0.022
10 FRUIT, VEG., FEED & MISC. FOOD PROD.	0.203	0.197	0.006	0.367	0.349	0.018	1.081	1.056	0.025
11 BEVERAGES	0.273	0.260	0.013	0.507	0.462	0.045	1.521	1.406	0.115
12 RUBBER, LEATHER, PLASTIC FAB. PROD.	0.096	0.087	0.009	0.177	0.154	0.023	0.530	0.469	0.061
13 TEXTILE PRODUCTS	0.043	0.034	0.009	0.079	0.059	0.02	0.236	0.179	0.057
14 KNITTED PRODUCTS AND CLOTHING	0.030	0.039	-0.009	0.056	0.068	-0.012	0.166	0.207	-0.041
15 LUMBER, SAWMILL, OTHER WOOD PROD.	0.268	0.205	0.063	0.488	0.363	0.125	1.446	1.099	0.347
16 FURNITURE AND FIXTURES	0.128	0.150	-0.022	0.237	0.266	-0.029	0.710	0.809	-0.099
17 PAPER AND PAPER PRODUCTS	0.109	0.116	-0.007	0.202	0.206	-0.004	0.603	0.624	-0.021
18 PRINTING AND PUBLISHING	0.280	0.234	0.046	0.521	0.416	0.105	1.561	1.265	0.296
19 PRIMARY METAL PRODUCTS	0.115	0.103	0.012	0.214	0.183	0.031	0.641	0.556	0.085
20 METAL FABRICATING PRODUCTS	0.120	0.145	-0.025	0.222	0.256	-0.034	0.662	0.778	-0.116
21 MACHINERY AND EQUIPMENT	0.072	0.059	0.013	0.138	0.107	0.031	0.396	0.316	0.08
22 AUTOS, TRUCKS, OTHER TRANS. EQUIP.	0.020	0.034	-0.014	0.036	0.059	-0.023	0.103	0.174	-0.071
23 ELECTRICAL AND COMMUNICATIONS PROD.	0.038	0.035	0.003	0.067	0.063	0.004	0.181	0.158	0.023
24 NON-METALLIC MINERAL PRODUCTS	0.208	0.304	-0.096	0.386	0.540	-0.154	1.155	1.641	-0.486
25 PETROLEUM AND COAL PRODUCTS	0.416	0.408	0.008	0.856	0.850	0.006	2.333	2.311	0.022
26 CHEMICALS AND CHEMICAL PRODUCTS	0.213	0.131	0.082	0.396	0.232	0.164	1.177	0.705	0.472
27 MISC. MANUFACTURED PRODUCTS	0.065	0.044	0.021	0.118	0.077	0.041	0.348	0.231	0.117
28 CONSTRUCTION	0.666	0.594	0.072	0.966	0.906	0.06	2.672	2.625	0.047
29 WHOLESALE AND RETAIL TRADE	0.882	0.825	0.057	1.171	1.199	-0.028	2.655	2.856	-0.201
30 TRANSPORTATION AND STORAGE	0.276	0.383	-0.107	0.455	0.636	-0.181	1.095	1.616	-0.521
31 COMMUNICATION SERVICES	0.758	0.663	0.095	1.235	1.190	0.045	2.487	2.320	0.167
32 OTHER UTILITIES	0.436	0.516	-0.08	1.135	1.145	-0.01	1.706	1.953	-0.247
33 REAL ESTATE RENT	0.511	0.410	0.101	1.029	0.989	0.04	1.918	1.922	-0.004
34 FINANCE, INSURANCE AND REAL ESTATE	0.405	0.351	0.054	0.834	0.867	-0.033	1.551	1.672	-0.121
35 BUSINESS, PERSONAL & OTHER MISC. SVCS	0.655	0.642	0.013	0.907	0.977	-0.07	2.044	2.328	-0.284
36 DUMMY COMMODITY I (1)	0.304	0.316	-0.012	0.460	0.483	-0.023	2.193	2.250	-0.057
37 DUMMY COMMODITY II (2)	0.443	0.429	0.014	0.686	0.702	-0.016	2.636	2.714	-0.078
38 TRANSPORTATION MARGINS (3)	0.276	0.383	-0.107	0.455	0.636	-0.181	2.095	2.616	-0.521
39 HOUSEHOLD SERVICES (4)	0.370	0.344	0.026	0.602	0.599	0.003	2.282	2.343	-0.061

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

APPENDIX IV
INDUSTRY AGGREGATION PARAMETERS

With 1980 Standard Industrial Classification (SIC), Canadian System of National Accounts (SNA) worksheet level industries increased to 216 from 190 under 1970 SIC. The Bureau's major and detailed industry groupings are based on 1980 worksheet level industries. This appendix includes the following:

- (1) SNA industry codes at worksheet level in terms of 1980 SIC.
- (2) The Bureau's major industry aggregation in terms of 1980 worksheet level numbers.
- (3) The Bureau's detailed industry aggregation in terms of 1980 worksheet level numbers.

Commodity aggregations remain basically the same as in the past. Although they are not provided in this appendix, they are available upon request.

INDUSTRY CODES AT THE WORKSHEET LEVEL (W)
IN TERMS OF 1980 SIC

NO. INDUSTRY TITLE – W			NO. INDUSTRY TITLE – W		
1980 SIC			1980 SIC		
1	Agriculture, livestock	011, 012, 021	39	Plastic bag industry	1691
2	Agriculture, fieldcrop	013-017, 022, 023	40	Other plastic products ind. nec	1699
3	Fishing & trapping industries	031-033	41	Leather tanneries	1711
4	Logging & forestry industries	0411, 0412, 0511	42	Footwear industry	1712
5	Gold mines	0611	43	Misc. leather & allied prod. ind.	1713, 1719
6	Other metal mines	0612-0616, 0619	44	Man-made fibre & filament yarn ind.	181
7	Iron mines	0617	45	Other spun yarn & woven cloth ind.	1829
8	Asbestos mines	0621	46	Wool yarn & woven cloth industry	1821
9	Potash mines	0624	47	Broad knitted fabric industry	183
10	Salt mines	0625	48	Misc. textile products industries	191, 193, 1991
11	Misc. non-metal mines exc. coal	0622, 0623, 0629			1993-1995, 1999
12	Coal mines	063	49	Contract textile dyeing & finishing	1992
13	Crude petroleum & natural gas	071	50	Carpet, mat & rug industry	192
14	Quarry & sand pit industries	081, 082	51	Men's and boy's clothing industries	243
15	Service related to mineral extract	091, 092	52	Women's clothing industries	244
16	Meat & meat products (exc. poultry)	1011	53	Children's clothing industry	245
17	Poultry products industry	1012	54	Misc. clothing & apparel industries	2491-2493,
18	Fish products industry	102			2495-2499
19	Fruit and vegetable industries	103	55	Hosiery industry	2494
20	Dairy products industries	104	56	Sawmills, planing & shingle mills	251
21	Flour & cereal food industries	1051, 1052	57	Veneer and plywood industries	252
22	Feed industry	1053	58	Pre-fab. wooden bldg. & cabinet	2541, 2542
23	Vegetable oil mills (exc. corn oil)	106	59	Door, window & other millwork ind.	2543, 2549
24	Biscuit industry	1071	60	Wooden box & coffin industries	256, 258
25	Bread & other bakery products ind.	1072	61	Particle & wafer board industries	2592, 2593
26	Cane & beet sugar industry	1081	62	Misc. wood industries	2591, 2599
27	Sugar confectionery industries	1082, 1083	63	Household furniture industries	261
28	Tea and coffee industry	1091	64	Office furniture industries	264
29	Misc. food products industries nec	1092-1099	65	Other furniture & fixture ind.	269
30	Soft drink industry	111	66	Pulp industry	2711
31	Distillery products industry	112	67	Newsprint industry	2712
32	Brewery products industry	113	68	Paperboard, bldg. board & oth. paper	2713-2719
33	Wine industry	114	69	Asphalt roofing industry	272
34	Tobacco products industries	121, 122	70	Paper box & bag industries	273
35	Rubber products industries	151-159	71	Other converted paper products ind.	279
36	Foamed & expanded plastic products	161	72	Commercial printing industries	281
37	Plastic pipe & pipe fittings ind.	162	73	Publishing industries	283
38	Plastic film and sheeting industry	163	74	Combined publishing & printing ind.	284

INDUSTRY CODES AT THE WORKSHEET LEVEL (W)
IN TERMS OF 1980 SIC – CONTINUED

NO.	INDUSTRY TITLE – W	1980 SIC	NO.	INDUSTRY TITLE – W	1980 SIC
75	Platemaking, typesetting & bindery	282	113	Small electrical appliance industry	331
76	Ferro-alloy & steel foundries	2911-2912	114	Major appliances (elec. & non-elec.)	332
77	Other primary steel industries	2919	115	Electric lighting industries	333
78	Steel pipe & tube industry	292	116	Record players, radio & tv receiver	334
79	Iron foundries	294	117	Telecommunication equipment ind.	3351
80	Non-ferrous smelting & refining ind.	295	118	Electronic parts & components ind.	3352
81	Aluminum rolling, casting, extruding	296	119	Other electronic equipment ind.	3359
82	Copper rolling, casting & extruding	297	120	Electronic computers & peripherals	3361
83	Other metal rolling, casting etc.	299	121	Misc. office, business machines	3362-3369
84	Power boiler & heat exchanger ind.	301	122	Electrical transformer industry	3371
85	Pre-eng. metal bldg. (exc. portable)	3023	123	Misc. electrical industrial equip.	3372-3379
86	Fabricated structural metal ind. nec	3021, 3022, 3029	124	Communications, energy wire & cable	338
87	Ornamental & arch. metal prod. ind.	303	125	Battery industry	3391
88	Stamped, pressed & coated metals	304	126	Misc. electrical product industries	3392-3399
89	Wire and wire products industries	305	127	Clay products industries	351
90	Hardware, tool & cutlery industries	306	128	Cement industry	352
91	Heating equipment industry	307	129	Concrete products industries	354
92	Machine shops industry	308	130	Ready-mix concrete industry	355
93	Other metal fabricating industries	309	131	Glass & glass products industries	356
94	Agriculture implement industry	311	132	Non-metal mineral insulation ind.	3594
95	Commercial refrigeration equipment	312	133	Misc. non-metallic mineral products	357, 358, 3591-3593, 3599
96	Compressor & turbine industries	3191, 3194	134	Refined petroleum & coal products	361, 369
97	Construction & mining machinery	3192	135	Industrial inorganic chemicals nec	3711
98	Sawmill & other machinery ind. nec	3193, 3199	136	Industrial organic chemicals nec	3712
99	Aircraft & aircraft parts industry	321	137	Agricultural chemical industries	372
100	Motor vehicle industry	323	138	Plastic & synthetic resin industry	373
101	Truck, bus body & trailer industry	324	139	Pharmaceutical & medicine industry	374
102	Motor vehicle engine & parts ind.	3251	140	Paint and varnish industry	375
103	Motor vehicle wiring assemblies	3252	141	Soap & cleaning compounds industry	376
104	Motor vehicle stampings industry	3253	142	Toilet preparations industry	377
105	Motor vehicle steering & suspension	3254	143	Other chemical products industries	379
106	Motor vehicle wheel & brake ind.	3255	144	Indicating & recording instruments	3911
107	Motor vehicle plastic parts ind.	3256	145	Other scientific & prof. equipment	3912-3914
108	Motor vehicle fabric accessories	3257	146	Jewellery & precious metal ind.	392
109	Other motor vehicle access. & parts	3259	147	Sporting goods industry	3931
110	Railroad rolling stock industry	326	148	Toys and games industry	3932
111	Shipbuilding and repair industry	327	149	Sign and display industry	397
112	Misc. transportation equipment ind.	328, 329			

**INDUSTRY CODES AT THE WORKSHEET LEVEL (W)
IN TERMS OF 1980 SIC - CONTINUED**

NO.	INDUSTRY TITLE - W	1980 SIC	NO.	INDUSTRY TITLE - W	1980 SIC
150	Floor tile, linoleum, coated fabric	3993	186	Credit unions	705
151	Musical instrument sound recording	3994	187	Other finance & real estate ind.	711-729, 741-743
152	Misc. manufactured products nec	3991, 3992, 3999			7499, 7511, 7512,
153	Repair construction	401-449			759, 761
154	Residential construction	401-449	188	Insurance industries	731, 732, 733
155	Non-residential bldg. construction	401-449	189	Govt. royalties on nat. resources	7495
156	Road, highway & airstrip const.	401-449	190	Owner occupied dwellings	7513
157	Gas & oil facility construction	401-449	191	Computer & related services	772
158	Dams & irrigation projects	401-449	192	Professional business services	773, 775, 776
159	Railway & telephone telegraph const.	401-449	193	Advertising services	774
160	Other engineering construction	401-449	194	Misc. business services	771, 777, 779
161	Construction, other activities	401-449	195	Educational services industries	851-859
162	Air transport & services incidental	451, 452	196	Hospitals	861
163	Railway transport & rel. services	453	197	Homes for personal & nursing care	8621
164	Water transport & rel. services	454, 455	198	Other health and social services	863, 865, 866,
165	Truck transport industries	456			8671, 8679, 868,
166	Urban transit system industry	4571			8691-8693, 8699
167	Interurban & rural transit systems	4572	199	Accommodation service industries	911-914
168	Taxicab industry	4581	200	Food & beverage service industries	921, 922
169	Misc. transportation industries	4573-4575, 4589	201	Motion picture & video prod. dist.	961
170	Other services incid. to transport	4592, 4599, 996,	202	Motion picture exhibition	962
		9991	203	Theatre, sports & rec. services	963, 9641, 9642,
171	Highway & bridge maintenance ind.	4591			965, 969
172	Natural gas pipeline transport ind.	4611	204	Race tracks and gambling operations	9643, 9644, 966
173	Crude oil & other pipeline transp.	4612, 4619	205	Laundries & cleaners	972
174	Storage and warehousing industries	471, 479	206	Other personal services	971, 973, 979
175	Radio & television broadcasting ind.	4811-4813	207	Photographers	993
176	Cable television industry	4814	208	Bus ass./mach. car leasing/oth. serv.	982, 983, 991,
177	Telecommunication carriers & other	482, 483			992, 9999, 4842
178	Postal service industry	4841	209	Other repair & maintenance services	994, 995
179	Electric power systems industry	491	210	Operating supplies	Fictive
180	Gas distribution systems industry	492	211	Office supplies	Fictive
181	Other utility industries nec	499	212	Cafeteria supplies	Fictive
182	Wholesale trade industries	501-599	213	Laboratory supplies	Fictive
183	Retail trade industries	601-692	214	Travel & entertainment	Fictive
184	Banks & oth. deposit accepting inst.	701, 702, 709	215	Advertising & promotion	Fictive
185	Trust/deposit accepting mortgage co.	703, 704	216	Transportation margins	Fictive

Source: Statistics Canada, Catalogue No. 15-201, 1989.

MAJOR INDUSTRY AGGREGATION IN TERMS OF WORKSHEET LEVEL NUMBERS

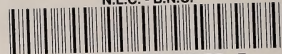
MAJOR INDUSTRY NUMBER	INDUSTRY TITLE	WORKSHEET LEVEL NUMBER
1	Agriculture	1 - 2
2	Forestry	4
3	Fishing, Hunting and Trapping	3
4	Mines, Quarries and Oil Wells	5 - 15
5	Manufacturing	16 - 152
6	Construction	153 - 161
7	Trade	182 - 183
8	Transportation and Storage	162 - 174
9	Communications	175 - 178
10	Utilities	179 - 181
11	Finance, Insurance and Real Estate	184 - 190
12	Comm., Bus. and Personal Services	191 - 209
13	Dummy Industry I	210 - 213
14	Dummy Industry II	214 - 215
15	Transportation Margins	216

DETAILED INDUSTRY AGGREGATION IN TERMS OF WORKSHEET LEVEL NUMBERS

DETAILED INDUSTRY NUMBER	INDUSTRY TITLE	WORKSHEET LEVEL NUMBER
1	Agriculture	1 - 2
2	Forestry	4
3	Fishing, Hunting and Trapping	3
4	Coal Mines	12
5	Petroleum and Gas Wells	13
6	Other Mines and Quarries	5 - 11, 14
7	Services Incidental to Mining	15
8	Meat and Poultry Products Industry	16 - 17
9	Dairy Factories	20
10	Misc. Food Industries	18, 19, 21 - 29
11	Beverage Industries	30 - 33
12	Rubber Industries	35
13	Leather Industries	41 - 43
14	Textile Industries	44 - 46, 48 - 50
15	Clothing Industries	47, 51 - 55
16	Wood Industries	56 - 62
17	Furniture and Fixtures Industries	63 - 65
18	Paper and Allied Industries	66 - 71
19	Printing and Publishing	72 - 75
20	Primary Metal Industries	76 - 83
21	Metal Fabricating Industries	84 - 93
22	Machinery Industries	94 - 98, 120, 121
23	Transportation Equipment Industries	99 - 112
24	Electrical Products Industries	113 - 119, 122 - 126
25	Non-Metallic Mineral Products Industries	127 - 133
26	Petroleum and Coal Products Industries	134
27	Chemical and Chemical Products Industries	135 - 143
28	Misc. Manufacturing Industries	34, 36 - 40, 144 - 152
29	Construction Industry	153 - 161
30	Wholesale and Retail Trade Industry	182 - 183
31	Transportation and Storage Industry	162 - 174
32	Communications Industry	175 - 178
33	Utilities	179 - 181
34	Finance, Insurance and Real Estate	184 - 190
35	Health and Hospital Industry	196 - 198
36	Business Services Industry	192 - 193
37	Accommodation and Food Services Industry	199 - 200
38	Other Personal and Misc. Services Industry	191, 194, 195, 201 - 209
39	Dummy Industry I	210 - 213
40	Dummy Industry II	214 - 215
41	Transportation Margins	216



N.L.C. - B.N.C.



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